What is Claimed is:

1. A fuel processing system for processing fuel for a fuel cell comprising:

a first adsorbent bed for adsorption of inorganic sulfur-containing compounds and high molecular weight organic sulfur-containing compounds;

a second adsorbent bed for adsorption of low molecular weight organic sulfur-containing compounds;

wherein said first and second adsorbent beds are arranged such that the fuel to be processed passes through one of said first and second adsorbent beds, and thereafter through the other of said first and second adsorbent beds.

2. A fuel processing system according to claim 1, wherein said first adsorbent bed and said second adsorbent bed are disposed in a common reaction vessel.

3. A fuel processing system according to claim 2, wherein said one and said other of said first and second adsorbent beds are said first adsorbent bed and said second adsorbent bed, respectively.

4. A fuel processing system according to claim 3, wherein said first adsorbent comprises copper-based activated carbon.

5. A fuel processing system according to claim 4, wherein said first adsorbent comprises copper-chromium based activated carbon.

6. A fuel processing system according to claim 5, wherein said copper-chromium based adsorbent has at least 5 percent of copper by weight and at least 2 percent of chromium by weight.

7. A fuel processing system according to claim 6, wherein said second adsorbent comprises a zeolite.

8. A fuel processing system according to claim 7, wherein:

said first adsorbent bed has a volume of 15 cubic feet;

said second adsorbent bed has a volume of 2 cubic feet;

said fuel processing system operates at a temperature between 50 and 120 degrees Fahrenheit;

said fuel processing system operates at a pressure between 10 and 100 psig; and

the gas hourly space velocity of the fuel flowing through said first adsorbent bed and said second adsorbent bed is between 100 and 500 h^{-1}.

9. A fuel processing system in accordance with claim 4, wherein said second adsorbent comprises zeolite.

10. A fuel processing system according to claim 9, wherein said zeolite is a sodium form zeolite.

11. A fuel processing system according to claim 1, further comprising:

a third adsorbent bed for adsorption of inorganic sulfur-containing compounds and high molecular weight organic sulfur-containing compounds;

a fourth adsorbent bed for adsorption of low molecular weight organic sulfur-containing compounds;

wherein said third and fourth adsorbent beds are arranged such that the fuel to be processed passes through one of said third and fourth adsorbent beds, and thereafter through the other of said third and fourth adsorbent beds.

12. A fuel processing system according to claim 12, wherein said first and second adsorbent beds are disposed in a first common reaction vessel, and wherein said third and fourth adsorbent beds are disposed in a second common reaction vessel.

13. A fuel processing system according to claim 12, wherein:

said one and said other of said first and second adsorbent beds are said first adsorbent bed and said second adsorbent bed, respectively; and

said one and said other of said third and fourth adsorbent beds are said third adsorbent bed and said fourth adsorbent bed, respectively.

14. A fuel processing system according to claim 13, further comprising a conduit and valve assembly, wherein said conduit and valve assembly is such that said first common reaction vessel and said second common reaction vessel can be one of connected in series such that the fuel to be processed passes through one of said first and second common reaction vessels and then through the other of said first and second common reaction vessels and connected in parallel such that the fuel to be processed passes through one of said first and second common reaction vessels while the other of said first and second common reaction vessels is in standby mode.

15. A fuel processing system according to claim 14, wherein said conduit and valve assembly is such that said first common reaction vessel and said second common reaction vessel can be connected in a lead lag system such that the fuel to be processed passes through one of said first and second common reaction vessels while the other of said first and second common reaction vessels is in lag mode and such that when said one of said first and second common reaction vessels is exhausted, the fuel to be processed is redirected to said other of said first and second common reaction vessels.

16. A fuel processing system according to claim 15, further comprising a purging system for purging said fuel processing system.

17. A fuel processing system according to claim 16, wherein said purging system comprises a purge gas supply for delivering purge gas to said fuel processing system and a purge line for removal of purge gas from said fuel processing system.

18. A fuel processing system according to claim 15, further comprising a filter for removal of particulate matter from fuel, wherein said filter follows said first and second common reaction vessels in relation to the direction of the flow of fuel being processed.

19. A fuel processing system according to claim 1, wherein said high molecular weight organic sulfur-containing compounds have molecular weights greater than 65 and said low molecular weight organic sulfur-containing compounds have molecular weights equal to or less than 65.

20. A fuel processing system comprising:

a first adsorbent bed for adsorption of inorganic sulfur-containing compounds and high molecular weight organic sulfur-containing compounds;

a second adsorbent bed for adsorption of low molecular weight organic sulfur-containing compounds;

wherein said first and second adsorbent beds are disposed within a common reaction vessel.

21. A fuel processing system according to claim 20, wherein said adsorbent beds are arranged such that the fuel to be processed passes through one of said first and second adsorbent beds, and thereafter through the other of said first and second adsorbent beds.

22. A fuel processing system according to claim 21, wherein said one and said other of said first and second adsorbent beds are said first adsorbent bed and said second adsorbent bed, respectively.

23. A fuel processing system according to claim 22, wherein said first adsorbent bed comprises copper-based activated carbon.

24. A fuel processing system according to claim 23, wherein said second adsorbent bed comprises a zeolite adsorbent.

25. A fuel processing system according to claim 21, further comprising:

a third adsorbent bed for adsorption of inorganic sulfur-containing compounds and high molecular weight organic sulfur-containing compounds;

a fourth adsorbent bed for adsorption of low molecular weight organic sulfur-containing compounds;

wherein said third and fourth adsorbent beds are disposed within a second common reaction vessel such that the fuel to be processed passes through one of said third and fourth adsorbent beds and, thereafter through the other of said third and fourth adsorbent beds.

26. A fuel processing system according to claim 25, wherein:

said one and said other of said first and second adsorbent beds are said first adsorbent bed and said second adsorbent bed, respectively; and

said one and said other of said third and fourth adsorbent beds are said third adsorbent bed and said fourth adsorbent bed, respectively.

27. A fuel processing system according to claim 26, wherein said first and third adsorbent beds comprise copper-based activated carbon and said second and fourth adsorbent beds comprise a zeolite.

28. A fuel processing system according to claim 27, further comprising a conduit and valve assembly interconnecting said first common reaction vessel and said second common reaction vessel, wherein said conduit and valve assembly is such that said first common reaction vessel and said second common reaction vessel can be one of connected in series such that the fuel to be processed passes through one of said first and second reaction vessels and then through the other of said first and second common reaction vessels and connected in parallel such that the fuel to be processed passes through one of said first and second common reaction vessels while the other of said first and second common reaction vessels is in standby mode.

29. A fuel processing system according to claim 28, wherein said conduit and valve assembly is such that said first common reaction vessel and said second common reaction vessel can be connected in a lead lag system such that the fuel to be processed passes through one of said first and second common reaction vessels while the other of said first and second common reaction vessels is in lag mode and such that when said one of said first and second common reaction

vessels is exhausted, the fuel to be processed is redirected to said other of said first and second common reaction vessels.

30. A fuel processing system according to claim 20, wherein said high molecular weight organic sulfur-containing compounds have molecular weights greater than 65 and said low molecular weight organic sulfur-containing compounds have molecular weights equal to or less than 65.

31. A fuel processing method for processing fuel for a fuel cell comprising the steps of:

providing a mixture of fuel and sulfur-containing compounds;

adsorbing from said mixture inorganic sulfur-containing compounds and high molecular weight organic sulfur-containing compounds using a first adsorbent bed;

adsorbing from said mixture low molecular weight organic sulfur-containing compounds using a second adsorbent bed;

wherein said first and second adsorbent beds being disposed so that said mixture of fuel and sulfur-containing compounds passes through one of said first and second adsorbent beds and, thereafter through the other of said first and second adsorbent beds.

32. A fuel processing method according to claim 31, wherein said first and second adsorbent beds are disposed in a common reaction vessel.

33. A fuel processing method according to claim 32, wherein said organic sulfur-containing compounds having a high molecular weight and said inorganic sulfur-containing compounds are firstly adsorbed using said first adsorbent bed and said organic sulfur-containing compounds having a low molecular weight are thereafter adsorbed using said second adsorbent bed.

34. A fuel processing method according to claim 33, wherein said first adsorbent bed comprises a copper-based activated carbon adsorbent and said second adsorbent bed comprises a zeolite adsorbent.

35. A fuel processing method according to claim 31, wherein said high molecular weight organic sulfur-containing compounds have molecular weights greater than 65 and said low molecular weight organic sulfur-containing compounds have molecular weights equal to or less than 65.

36. A fuel processing method for processing fuel comprising the steps of:

providing a mixture of fuel and sulfur-containing compounds;

absorbing from said mixture inorganic sulfur-containing compounds and high molecular weight organic sulfur-containing compounds using a first adsorbent bed;

adsorbing from said mixture low molecular weight organic sulfur-containing compounds using a second adsorbent bed;

wherein said first and second adsorbent beds are disposed within a common reaction vessel.

37. A fuel processing method according to claim 36, wherein said organic sulfur-containing compounds having a high molecular weight and said inorganic sulfur-containing compounds are firstly adsorbed by said first adsorbent bed and said organic sulfur-containing compounds having a low molecular weight are thereafter adsorbed using said second adsorbent bed.

38. A fuel processing method according to claim 37, wherein said first adsorbent bed comprises a copper-based activated carbon adsorbent and said second adsorbent bed comprises a zeolite adsorbent.

39. A fuel processing method according to claim 38, wherein said high molecular weight organic sulfur-containing compounds have molecular weights greater than 65 and said low molecular weight organic sulfur-containing compounds have molecular weights equal to or less than 65.